PROPOSED

Permit Application Review Summary

Application No.: Minor Modification No. 0097-12

Permit No.: Covered Source Permit (CSP) No. 0097-01-C

Applicant: Kauai Island Utility Cooperative (KIUC)

Facility:
Port Allen Generating Station
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UTM Coordinates: 2,422,222 N, 439,251.6 E
Eleele, Kauai, Hawaii 96705

Mailing Address:
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Application Dates:
March 29, 2016
Additional information dated April 29, 2016

Proposed Project:

The Standard Industrial Classification (SIC) Code is 4911 under *Electric Services*.

This application is for a minor modification of Covered Source Permit (CSP) No. 0097-01-C, issued on December 11, 2012. A check for $200.00 was submitted by the applicant for a minor modification of a covered source (PSD source) and processed.

When the Stork Wartsila Diesel (SWD) engines at Port Allen were originally permitted in 1988, KIUC intended to operate the engines as base load units. The original Prevention of Significant Deterioration (PSD) permit included a minimum allowable operating load of 50% of rated load, or about 4 MW. Between their initial operation in the early 1990s until KIUC began to integrate significant renewables into the generating system in 2010, the engines functioned as planned, operating at between 85% and 90% of rated load.

By 2012, KIUC had begun to integrate photovoltaic (PV) solar generating capacity into its resource mix. KIUC planned to increase the amount of solar and hydro resources in its portfolio and, in order to increase operational flexibility, applied for and received an amendment to the minimum load condition to allow operation of the engines down to about 25% load (about 2 MW) in 2013.

Currently, the challenge of integrating renewable generating resources into the island's generating resource mix has increased considerably. The most significant elements of the renewable portfolio are large new additions of PV solar generating capacity and hydropower, island-wide, which have been phased in over the past few years. Recently, a new 12 MW PV solar field was installed in Anahola, bringing the total solar capacity of KIUC's generating system to 28 MW. In addition, the new Green Energy Team biomass boiler came online in 2016, providing an additional 7 MW of renewable capacity. These PV, hydro, and biomass resources provide low-cost, low greenhouse gas-emitting electricity for the residents of Kauai. However, most renewable energy facilities such as wind and solar are intermittent sources, meaning these resources are not available to generate in all hours and have limited operating capacity, flexibility, or predictability. For example, the output from the 12 MW PV generating station can drop from 12 MW to almost zero when clouds obscure the sun, only to return to 12 MW minutes later when the sky clears. Any demand that is suddenly no longer met with solar generation must be met instantaneously with electricity from other generating sources.

Furthermore, most renewable resources have no ability to provide regulation – the ability to ramp up and down quickly at the system operator's direction to maintain a line voltage and frequency adequate to ensure electric system reliability. Therefore, KIUC needs to increase its ability to firm the renewable resources by having flexible generation that is always available under all operating conditions to ramp up or ramp down, as necessary, to balance load and generation. The proposed modification would allow the SWD engine generators – which are currently KIUC's most efficient flexible generating units – to be operated at very low loads, making them available to ramp up quickly to maintain system reliability as increasing amounts of renewable resources continue to be integrated into the utility's generating system. The SWDs will no longer be used as base load units, but will continue to be used for intermediate load support (at night when there is no PV power available, for example).

Based on this operating experience and continuous emissions monitoring data, KIUC is requesting the following changes to the covered source permit:

- Reduce the minimum operating load from 25% (or approximately 2 MW) to 1 MW (approximately 12.5%); and
- Modify the requirement to allow diesel engine generator D-9 to operate without the selective catalytic reduction system when the engine operates below 25% load, as long as the NO_x emissions limit continues to be met; and
- Add a new lb/hr NO_x limits for Units D-6, D-7, and D-8 that will apply during operation below 25% load.

KIUC is not proposing to change any other hourly limits or any daily or annual permitted emission limits as a result of the requested changes.

This modification is considered a minor modification since it:

(1) Does not increase the emissions of any air pollutant above the permitted emission limits;

(2) Does not result in or increase the emissions of any air pollutant not limited by permit to levels equal to or above:

(A) 500 pounds per year of a hazardous air pollutant, except lead;
(B) 300 pounds per year of lead;
(C) Twenty-five (25) percent of significant amounts of emission as defined in Section 11-60.1-1, paragraph (1) in the definition of "significant"; or
(D) Two (2) tons per year of each regulated air pollutant not already identified above;

(3) Does not violate any applicable requirement;
(4) Does not involve significant changes to existing monitoring requirements or any relaxation or significant change to existing reporting or recordkeeping requirements in the permit. Any change to the existing monitoring, reporting, or recordkeeping requirements that reduces the enforceability of the permit is considered a significant change;
(5) Does not require or change a case-by-case determination of an emission limitation or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis;
(6) Does not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement, and that the source has assumed to avoid an applicable requirement to which the source would otherwise be subject. Such terms and conditions include:

(A) A federally enforceable emissions cap assumed to avoid classification as a modification pursuant to any provision of Title I of the Act or subchapter 7; and
(B) An alternative emissions limit approved pursuant to regulations promulgated pursuant to Section 112(i)(5) of the Act or Subchapter 9; and

(7) Is not a modification pursuant to any provision of Title I of the Act.

Equipment:

Unit Number	Manufacturer	Model/ Serial Number	Rated Capacity		
			MW	MMBtu/hr	gal/hr
D-6 through D-9	Stork-Wartsila Diesel Generator	6TM620/ 60600, 60700, 60800, 60900	7.86 each	69.5 each	505 each

Air Pollution Controls:

1. Diesel engine generators D-6 through D-8 are equipped with Variable Fuel Injection Timing Retard (FITR).
2. Diesel engine generator D-9 is equipped with a Selective Catalytic Reduction (SCR) System as part of a NO_x control technology demonstration project. This project was deemed successful and shows the *technical* feasibility of a SCR system. The economic feasibility was not shown, however.
3. Low sulfur fuel (0.4%) fuel oil no. 2, and/or biodiesel is used for diesel engine generators D-1 through D-9.

4. Diesel engine generators D-1 thru D-5 are equipped with Miratech V-Cat oxidation catalyst systems and EMD lube oil separators and will utilize ultra-low sulfur (0.0015%) fuel oil to comply with 40 CFR Part 63, Subpart ZZZZ, effective May 3, 2013.
5. Diesel engine generators D-6 thru D-9 are equipped with oxidation catalyst systems and crankcase controls to comply with 40 CFR Part 63, Subpart ZZZZ, effective May 3, 2013.

Alternate Operating Scenarios:

No change from the previous covered source renewal application regarding any alternate operating scenarios.

Applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 59	Ambient Air Quality Standards
Title 11, Chapter 60.1	Air Pollution Control
Subchapter 1	General Requirements
Subchapter 2	General Prohibitions
HAR 11-60.1-31	Applicability
HAR 11-60.1-32	Visible Emissions
HAR 11-60.1-38	Sulfur Dioxides from Fuel Combustion
Subchapter 5	Covered Sources
Subchapter 6	Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
HAR 11-60.1-111	Definitions
HAR 11-60.1-112	General Fee Provisions for Covered Sources
HAR 11-60.1-113	Application Fees for Covered Sources
HAR 11-60.1-114	Annual Fees for Covered Sources
Subchapter 9	Hazardous Air Pollutant Sources
HAR 11.60.1-174	Maximum Achievable Control Technology (MACT) Emission Standards

Federal Requirements

40 Code of Federal Regulations (CFR) Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technologies (MACT) Standards):

Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. (RICE NESHAP) - applicable to stationary RICE located at major or area sources of HAP emissions. This site is an area source of HAP emissions.

Non-applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 60.1	Air Pollution Control
Subchapter 7	Prevention of Significant Deterioration Review
Subchapter 8	Standards of Performance for New Stationary Sources (NSPS)
Subchapter 9	Hazardous Air Pollutant Sources
HAR 11.60.1-180	National Emission Standards for Hazardous Air Pollutants

Federal Requirements

40 CFR Part 52.21 - Prevention of Significant Deterioration of Air Quality
40 CFR Part 60 - Standards of Performance for New Stationary Sources (NSPS)
40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP)

Prevention of Significant Deterioration (PSD):

PSD is not applicable because this facility is not a *new* major stationary source nor does this application propose any *major modifications* to a major stationary source as defined in 40 CFR 52.21. A PSD major modification is defined as a project at an existing major stationary source that will result in a significant emissions increase and a significant net emissions increase of any regulated NSR pollutant as defined in 40 CFR §52.21. Since there are no significant emission increases for this project, PSD is not triggered. Note that the PSD applicability from Significant Modification Application No. 0097-11, as shown in the table below, remains valid as the low load emissions from this application would not affect PSD applicability.

Pollutant	Current Maximum Annual Emissions from Spec Oil Burning (tpy)	Post-Amendment Current Maximum Annual Emissions from Spec Oil Burning (tpy)	Emission Increase (tpy)	PSD Threshold (tpy)	Exceeds?
NO_x	9.6	19.6	10.0	40	no
SO_2	35.5	35.5	0	40	no
CO	2.5	0.0	-2.5	100	no
VOC	0.1	0.1	0	40	no
PM_{10}	4.0	8.7	4.8	15	no
$PM_{2.5}$	2.8	5.4	2.5	10	no
GHG	11,248	11,050	-199	75,000	no

Best Available Control Technology (BACT):

A Best Available Control Technology (BACT) analysis is required for new covered sources or significant modifications to covered sources that have the potential to emit or increase emissions above significant levels as defined in HAR §11-60.1-1. Since this is not a new source nor are any modifications proposed that will cause a significant increase in emissions, a BACT analysis is not required.

Air Emissions Reporting Requirements (AERR):

40 CFR Part 51, Subpart A – Air Emissions Reporting Requirements, is based on the emissions of criteria air pollutants from Type A or Type B point sources (as defined in 40 CFR Part 51, Subpart A), that emit at the AERR triggering levels as shown in the table below.

Pollutant	Type A AERR Triggering Levels [1] (tpy)	Type B AERR Triggering Levels [1] (tpy)	Pollutant	In-house Total Facility Triggering Levels [1] (tpy)	Total Facility Emissions (tpy)
NO_x	≥2500	≥100	NO_x	≥25	6683.7
SO_2	≥2500	≥100	SO_2	≥25	1874.2
CO	≥2500	≥1000	CO	≥250	370.6
$PM_{10}/PM_{2.5}$	≥250/≥250	≥100/100	PM/PM_{10}	≥25/25	PM = 203.6 PM_{10} = 203.6 $PM_{2.5}$ = 203.6
VOC	≥250	≥100	VOC	≥25	447.2
			HAPS	≥5	18.67

[1] Based on potential emissions

This facility emits above the AERR triggering levels. Therefore, AERR requirements are applicable.

The Clean Air Branch also requests annual emissions reporting from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels or is a covered source. Annual emissions reporting is required for this facility for in-house recordkeeping purposes since it is a covered source.

Compliance Assurance Monitoring CAM):

40 CFR Part 64

Applicability of the CAM rule is determined on a pollutant specific basis for each affected emission unit. Each determination is based upon a series of evaluation criteria. In order for a source to be subject to CAM, each source must:

- Be located at a major source per Title V of the Clean Air Act Amendments of 1990;
- Be subject to federally enforceable applicable requirements;
- Have pre-control device potential emissions that exceed applicable major source thresholds;
- Be fitted with an “active” air pollution control device; and
- Not be subject to certain regulations that specifically exempt it from CAM.

Emission units are any part or activity of a stationary source that emits or has the potential to emit any air pollutant.

There is no change from the previous covered source renewal application regarding CAM requirements.

Synthetic Minor Source:

Not applicable, this facility is a major source.

Project Emissions:

Comparison of 1 MW Performance Test Results with Permitted Limits

Engine	Pollutant	Test Result [1]	Permit Limit
D-6	NO_x (ppmvd[2])	337	n/a[3]
	NO_x (lb/hr)	16	85[4]
	CO (ppmvd)	11	23[5]
	CO (lb/hr)	0.3	7.2
D-9	NO_x (ppmvd)	380	n/a[3]
	NO_x (lb/hr)	17.9	40.55[6]
	CO (ppmvd)	29	23[5]
	CO (lb/hr)	0.8	13.5

1 Single 30-minute test runs at approximately 12.5% of rated engine load.
2 Parts per million by volume, dry, corrected to 15% O_2. Limits apply only at full load (100% to 110% of rated load).
3 NO_x concentration limits apply only at full load (100% to 110% of rated load).
4 Proposed new NO_x limit for D-6, D-7, and D-8 at loads below 25%.
5 CO limits are 23 ppmvd or 70% reduction across oxidation catalyst.
6 Proposed new NO_x limit for D-9 at loads below 25%.

Ambient Air Quality Impact Analysis:

The applicant prepared an ambient air quality impact analysis to demonstrate that low-load operation of the engines will not result in the violation of any ambient air quality standards. Because fuel flow to the engines are lower during low-load operation, exhaust gas flow rates and thus stack velocities are reduced and dispersion is affected. This analysis uses stack parameters that reflect operation of all four engines at the proposed new minimum operating load of 1 MW (~12.5% of rated load) and compares impacts at 1 MW load with impacts at the current minimum load of 25% (2 MW). The fuel flow rates, stack gas oxygen contents, and exhaust gas temperatures were collected during the low load test program and thus reflect actual engine operating data. The facility layout, receptor grid, and meteorological data used in the ambient air quality modeling analysis were identical to those used in the most recent submittal. The engines are modeled as operating simultaneously at minimum load to represent the anticipated worst case. The emission rates, stack parameters, and results of the ambient air quality modeling analysis are shown in the tables below. The modeling results for the engines at 25% (2 MW) and ~12.5% (1 MW) of rated load are below the SAAQS/NAAQS. Note that the boiler in Significant Modification Application No. 0097-11, which requested the use of 100% specification used oil in the boiler, is not expected to be operated simultaneously during the low-load operation of diesel engine generators D-6 thru D-9.

The following procedures, used also in Minor Modification Application No. 0097-09, were used for the modeling:

<u>AERMOD</u>
AERMOD model (version 15181) and the meteorological data collected at Burns Field, Kauai, between 1997/1998 was used to initially model the air quality impacts from the proposed modified sources (D6, D7, D8, and D9) for all averaging periods. To obtain the 1-hour NO_2 impacts, the Ozone Limiting Method (OLM) option was used within AERMOD to estimate the 1-hour NO_2 ambient impacts for both the maximum and highest 8th highest (98^{th} percentile) modeled impacts. To obtain the 1-hour SO_2 impacts, both the maximum and highest 4th highest (99^{th} percentile) modeled impacts were output from AERMOD. Maximum impacts were located in complex terrain, at receptors whose height are above the top of stack height, to the north to the KIUC Port Allen Generating Station power plant.

CTSCREEN

CTSCREEN was then used for a more refined assessment of the 1-hour and annual average NO_2 and 1-hour average SO_2 project impacts in terrain above stack top elevation. CTSCREEN maximum short-term impacts from the projects occur in elevated terrain to the North of the project. Because CTSCREEN is a screening model, 98th and 99th percentile values could not be generated (for 1-hour NO_x and 1-hour SO_2 impacts, respectively), and the highest modeled concentrations were used. Further, the CTSCREEN results for 1-hour average NO_2 were in the form of NO_x, with no OLM adjustment. Unlike AERMOD, CTSCREEN does not have the capability of performing ozone limiting internally within the model. Therefore, if the CTSCREEN results were used without ozone limiting, it would erroneously be assuming that all of the NO_x emitted from the power plant units is converted to NO_2. This is obviously an overly conservative assumption, which can be addressed in a manner consistent with Appendix W by applying ozone limiting techniques.

The June 28, 2010, Tyler Fox memo (part of the June 29, 2010, Stephen Page memo at http://www.epa.gov/nsr/documents/20100629no2guidance.pdf) addresses the applicability of OLM (and PVMRM) in a generic sense as well as in the context of AERMOD. The memo discusses the three-tier screening approach in Appendix W—Tier 3, the most detailed approach, utilizes OLM as "a detailed screening technique for point sources." The discussion goes on to indicate that "key model inputs for OLM are the in-stack ratios of NO_2/NO_x emissions and background ozone concentrations." In AERMOD, these are model inputs; however, as discussed above, CTSCREEN does not have the capability of using these inputs and performing the ozone limiting calculations internal to the model, so it must be done manually, external to the model. The ozone value used for ozone limiting was the average of the highest hourly ozone measurements for the most recent three years, 2013, 2014, and 2015 at Lauwiliwili Street.[1]

Ozone (ppm)			
2013	2014	2015	Average
0.063	0.053	0.055	0.057

The highest modeled 1-hour average NO_x impact from CTSCREEN was converted from µg/m^3 (model output) to ppm. The ozone limiting equation NO_2 (ppm, total) = 0.1 * NO_x (ppm) + O_3 (ppm) was used to calculate the total modeled concentrations of NO_2 for the 1 MW case.
NO_2 (ppm) = 0.1 * (772.4 µg/m^3 * 1 ppm/1880 µg/m^3) + 0.057 ppm = 0.098 ppm = 184 µg/m^3

Annual NO_x impacts were derived using the maximum modeled 1-hour average impact from CTSCREEN (772.4 µg/m^3) and the CTSCREEN conversion factor of 0.03.[2]
772.4 µg/m^3 * 0.03 = 23 µg/m^3

[1] One-hour ozone values were obtained from EPA's AirData Monitor Values Report website: *www3.epa.gov/airdata/ad_rep_mon.html.*

[2] US EPA, User's Guide to CTDMPLUS: Volume 2. The Screening Mode (CTSCREEN) (Abridged), October 1990; Section 2.3.

Emission Rates Used for Modeling

Engine	Pollutant	Emission Rate 1 MW Load (lb/hr)
D-6, D-7, D-8	NO_x	**85**
D-6, D-7, D-8	CO	7.2
D-9	NO_x	**40.55**
D-9	CO	13.5
All	SO_2	4.95
	$PM_{10}/PM_{2.5}$	5.23

Proposed new limits are shown in bold.

Stack Parameters and Emission Rates Used for Modeling

Unit	Engine Load (%)	Exhaust Temp. (K)	Exhaust Gas Flow Rate (m^3/s)	Velocity (m/s)	NO_x (g/s)	SO_x (g/s)	CO (g/s)	PM (g/s)
D-6,7,8	25	669.61	10.365	10.69	13.860	1.030	0.907	0.659
D-9	25	669.61	10.365	10.69	5.109	1.030	1.701	0.659
D-6,7,8	12.5	555.778	7.906	8.15	10.710	0.624	0.907	0.659
D-9	12.5	555.778	7.906	8.15	5.109	0.624	1.701	0.659

Note: Stack height and diameter for all units remains unchanged at 27.432 m and 1.11 m, respectively.

Results of the Air Quality Modeling Analysis[a]

Pollutant	Average Period	Engine Load 2 MW (25%) ($\mu g/m^3$)	Engine Load 1 MW (12.5%) ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Model Used
NO_2	1-hr (98^{th} pctl)	184	184	188	-	CTSCREEN/OLM
	annual	34	23	100	75	CTSCREEN
SO_2	1-hr (99^{th} pctl)	77	52	196	-	CTSCREEN
	3-hr	140	98	1300	1300	AERMOD
	24-hr	54	31	-	365	AERMOD
	annual	12.3	8.5	-	80	AERMOD
CO	1-hr	385	459	40,000	10,000	AERMOD
	8-hr	321	67	10,000	5,000	AERMOD
PM_{10}	24-hr	26	33	150	150	AERMOD
	annual	7.9	9.0	-	50	AERMOD
$PM_{2.5}$	24-hr (98^{th} pctl)	26	26	35	-	AERMOD
	annual	7.9	9.0	12	-	AERMOD

[a] Modeling analysis did not include background concentrations since this is an existing covered source and not a new covered source or significant modification per HAR §11-60.1-83(a)(11) & (12).

Significant Permit Conditions and Discussion:

The following permit conditions in the covered source permit were modified. As is custom when modifying regulatory language, new language is underlined, while [deleted language is shown in brackets].

1. Attachment II(C), Special Condition No. C.1.d.

   d. Selective catalytic reduction (SCR) system including an ammonia slip monitoring system on diesel engine generator D-9. The ammonia slip shall remain below 20 ppmvd at 15% O_2. At loads below 25% (2 MW), urea will be injected as needed to maintain compliance with the applicable NO_x limits; and

2. Attachment II(C), Special Condition No. C.4.

   4. Operating Load Limits

      The permittee shall not allow the operation of diesel engine generators D-6, D-7, D-8, and D-9, below 1 MW [twenty-five (25) percent of rated load], except during equipment startup, shutdown, maintenance, or testing. The permittee shall not allow the operation of diesel engine generators D-6, D-7, D-8, and D-9, above 110 percent of rated loads at any time. Engine load shall be determined on a 15-minute average basis.

      (Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-132; 40 CFR §52.21)[1]

3. Attachment II(C), Special Condition No. C.5.

   5. Maximum Emission Limits

      The permittee shall not discharge or cause the discharge into the atmosphere from each of diesel engine generators D-6, D-7, D-8, and D-9, nitrogen oxides, sulfur dioxide, carbon monoxide, volatile organic compounds, and particulate matter in excess of the following specified limits:

Compound	Maximum Emission Limits* (lbs/hr)
Sulfur Dioxide	33.14
Nitrogen Oxides (as NO_2)(above 50% of rated load)	
Units D-6, D-7, and D-8 (except during startup and shutdown, as defined in Special Condition Nos. C.9.a and C.9.c of this Attachment)	185.22
Unit D-9 (except during NO_x startup and shutdown, as defined in Special Condition Nos. C.9.b and C.9.c of this Attachment)	68.28
Nitrogen Oxides (as NO_2)(at 50% of rated load)	
Units D-6, D-7, and D-8 (except during startup and shutdown, as defined in Special Condition Nos. C.9.a and C.9.c of this Attachment)	125

Unit D-9 (except during NO_x startup and shutdown, as defined in Special Condition Nos. C.9.b and C.9.c of this Attachment)	61.76
Nitrogen Oxides (as NO_2)(<u>at 25% to</u> [below] 50% of rated load)	
Units D-6, D-7, and D-8 (except during startup and shutdown, as defined in Special Condition Nos. C.9.a and C.9.c of this Attachment)	110
Unit D-9 (except during NO_x startup and shutdown, as defined in Special Condition Nos. C.9.b and C.9.c of this Attachment)	40.55
<u>Nitrogen Oxides (as NO_2)(below 25% of rated load)</u>	
<u>Units D-6, D-7, and D-8 (except during startup and shutdown, as defined in Special Condition Nos. C.9.a and C.9.c of this Attachment)</u>	<u>85</u>
<u>Unit D-9 (except during NO_x startup and shutdown, as defined in Special Condition Nos. C.9.b and C.9.c of this Attachment)</u>	<u>40.55</u>
[Carbon Monoxide (prior to May 3, 2014)]	
[Units D6, D-7, and D-8]	[23.90]
[Unit D-9]	[45.00]
Carbon Monoxide (on and after May 3, 2014, except during startup, as defined in Special Condition No. C.9.a of this Attachment)	
Units D-6, D-7, and D-8	7.2
Unit D-9	13.5
Volatile Organic Compounds as Carbon	22.80
Particulate Matter (at or above 50% of rated load)	7.85
Particulate Matter (below 50% of rated load)	5.23

*Three-hour (3-hour) averages.

4. Attachment II(C), Special Condition No. C.6.

6. Emission Limitations for Generator Loads

The permittee shall not discharge or cause the discharge into the atmosphere from each of diesel engine generators D-6, D-7, D-8, and D-9, nitrogen oxides, sulfur dioxide, carbon monoxide, volatile organic compounds, and particulate matter in excess of the following specified limits at full load:

Compound	**Emission Limits for Each Diesel Engine Generator* at Full Load (@ 15% O_2)**
	100-110%
Sulfur Dioxide (ppmvd)	97
Nitrogen Oxides (ppmvd) as NO_2	
Units D-6, D-7, and D-8 (except during startup and shutdown, as defined in Special Condition	590

Nos. C.9.a and C.9.c of this Attachment) Unit D-9 (except during NO_x startup and shutdown, as defined in Special Condition Nos. C.9.b and C.9.c of this Attachment)	290
[Carbon Monoxide (ppmvd) (prior to May 3, 2014)]	
[Units D-6, D-7, and D-8]	[160]
[Unit D-9]	[302]
Carbon Monoxide (ppmvd) (on and after May 3, 2014, except during startup, as defined in Special Condition No. C.9.a of this Attachment)	
Units D-6, D-7, and D-8	48
Unit D-9,	91
Volatile Organic Compounds (ppmvd) as Carbon	267
Particulate Matter (lb/MMBtu)	
Units D-6, D-7, and D-8	0.11
Unit D-9	0.11

*Three-hour (3-hour) averages.

If any emission limit is lowered, the difference between the existing emission limit and the revised lower emission limit shall not be allowed as an emission offset for future construction or modification.

5. Attachment II(C), Special Condition No. C.8.

The permit condition in Attachment II(C), Special Condition No. C.8.d was corrected by deleting the pressure drop measurements at 100% load ± 10% in accordance with Table 2b (item 2) of 40 CFR Part 63, Subpart ZZZZ. Also, the pressure drop measured during the March 2016 performance test versus the initial performance test would be used since EPA approved KIUC's request for alternative pressure drop monitoring as KIUC wants to establish a new pressure drop range that's different from the pressure drop at the load at which the initial performance test was done. This situation is unique to KIUC because (1) the SWD pressure drops vary a lot with load; and (2) the SWDs no longer operate in the load ranges where the initial performance tests were done due to the large usage of renewable energy. In addition, Attachment II(C), Special Conditions Nos. C.8.d and C.8.e were corrected in accordance with 40 CFR Part 63, Subpart ZZZZ by incorporating the missing startup regulation.

8. On and after May 3, 2014, the permittee shall comply with the following requirements for each diesel engine generator:

   a. Oxidation catalyst systems shall be installed and operated on diesel engine generators D-6, D-7, D-8, and D-9;
   b. Except during startup, limit concentration of CO in the stationary RICE exhaust to twenty-three (23) ppmvd at fifteen (15) percent O_2; or reduce CO emissions by seventy (70) percent or more;
   c. Except during startup, maintain engine exhaust temperature so that the temperature at the oxidation catalyst inlet is greater than or equal to 450 °F and less than or equal to 1350 °F;
   d. <u>Except during startup,</u> maintain the oxidation catalyst so that the pressure drop does not change by more than 2" H_2O [at 100% load (±10%)] from pressure drop across the catalyst measured during the <u>March 2016 performance test or a</u>

subsequent performance test as provided in 40 CFR §63.6640(b) [initial performance test];

e. Minimize engine idling during startup and limit startup to less than thirty (30) minutes; and
f. Install, operate and maintain a filtration system on the open crankcase ventilation system.

6. Attachment II(C), Special Condition No. F.3.

Permit condition was corrected in accordance with 40 CFR Part 63, Subpart ZZZZ.

3. The permittee shall conduct performance tests on each diesel engine generator to demonstrate compliance with the requirements of Special Condition No. C.8.b of this Attachment no later than October 30, 2014. Performance tests shall be conducted for carbon monoxide (CO). [The catalyst pressure drop and catalyst inlet temperature shall also be measured and recorded.] Subsequent performance tests shall be conducted after every 8,760 hours of operation or three (3) years of operation, whichever comes first. Performance tests shall be conducted under such conditions as the EPA specifies to the permittee based on representative performance (i.e., performance based on normal operating conditions) of the diesel engine generator. Performance tests for emissions of CO shall be conducted and results recorded and reported in accordance with the test methods and procedures set forth in 40 CFR §63.6620.

7. Attachment II(B), Special Condition No. C.5.

The permit condition in Attachment II(B), Special Condition No. C.5.d was corrected by deleting the pressure drop measurements at 100% load ± 10% in accordance with Table 2b (item 2) of 40 CFR Part 63, Subpart ZZZZ. Also, the pressure drop measured during the March 2016 performance test versus the initial performance test would be used since EPA approved KIUC's request for alternative pressure drop monitoring as KIUC wants to establish a new pressure drop range that's different from the pressure drop at the load at which the initial performance test was done. This situation is unique to KIUC because (1) the EMD pressure drops vary a lot with load; and (2) the EMDs no longer operate in the load ranges where the initial performance tests were done due to the large usage of renewable energy. In addition, Attachment II(B), Special Conditions Nos. C.5.d and C.5.f were corrected in accordance with 40 CFR Part 63, Subpart ZZZZ by incorporating the missing startup regulation.

5. On and after May 3, 2013, the permittee shall comply with the following requirements for each diesel engine generator:

a. Oxidation catalyst systems shall be installed and operated on diesel engine generators D-1, D-2, D-3, D-4, and D-5;
b. Except during startup, limit concentration of CO in the stationary RICE exhaust to 23 ppmvd at fifteen (15) percent O_2; or reduce CO emissions by seventy (70) percent or more;
c. Except during startup, maintain engine exhaust temperature so that the temperature at the oxidation catalyst inlet is greater than or equal to 450 °F and less than or equal to 1350 °F;
d. Except during startup, maintain the oxidation catalyst so that the pressure drop does not change by more than 2" H_2O [at 100% load (±10%)] from pressure drop

across the catalyst measured during the March 2016 performance test or a subsequent performance test as provided in 40 CFR §63.6640(b) [initial performance test];

e. Use diesel fuel with a maximum sulfur content not to exceed 0.0015% by weight and a minimum cetane index of forty (40) or a maximum aromatic content of thirty-five (35) volume percent;
f. Minimize engine idling during startup and limit startup to less than thirty (30) minutes; and
g. Operate and maintain a filtration system on the crankcase ventilation system.

8. Attachment II(B), Special Condition No. F.1.

Permit condition was corrected in accordance with 40 CFR Part 63, Subpart ZZZZ.

1. The permittee shall conduct initial performance tests on each diesel engine generator to demonstrate compliance with the requirements of Special Condition No. C.5.b of this Attachment no later than October 30, 2013. Performance tests shall be conducted for carbon monoxide (CO). [The catalyst pressure drop and catalyst inlet temperature shall also be measured and recorded.] Subsequent performance tests shall be conducted after every 8,760 hours of operation or three (3) years of operation, whichever comes first. Performance tests shall be conducted under such conditions as the EPA specifies to the permittee based on representative performance (i.e., performance based on normal operating conditions) of the diesel engine generator. Performance tests for emissions of CO shall be conducted and results recorded and reported in accordance with the test methods and procedures set forth in 40 CFR §63.6620.

Conclusion:

Recommend issuing the minor modification to Covered Source Permit No. 0097-01-C, issued on December 11, 2012, and amended on April 10, 2013, May 2, 2013, July 17, 2013, January 3, 2014, March 20, 2014, November 28, 2014, and June 7, 2016. There are no increases in emissions with the proposed change and the diesel engines would remain in compliance with the State and Federal ambient air quality standards. The permit would incorporate the significant permit conditions listed above and be subject to a 45-day EPA review period.

Reviewer: Darin Lum
Date: 6/2016